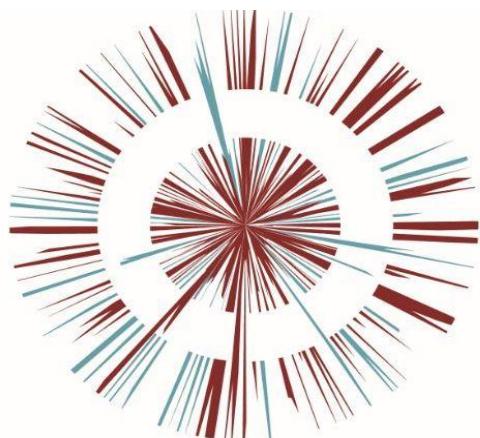




OMEGA ZONE 8, ST HELENS

Omega St Helens Ltd / T. J. Morris Limited



Detailed Plot: Lighting
Strategy

Document No. UNIT 1 DOC.2

Omega St Helens Ltd / T. J. Morris Limited

Unit 1

Omega Zone 8

190081

UNIT 1 DOC.2 Lighting Strategy

DOCUMENT REVISION HISTORY			Ref:	UNIT 1 Doc 2 Lighting Strategy
Rev	Author	Verification By	Date	Comments / Status
P1	Charlie Pimm	Chris Ward	13/11/19	For information
P2	Charlie Pimm	Alex Cox	13/12/19	Planning Issue

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External Lighting Report

1.0 Introduction

Couch Perry & Wilkes LLP have produced this report to summarise the external lighting design and calculations for the proposed development on land adjacent to the M62 motorway.

The lighting design will utilise various forms to provide functional, amenity and security lighting to lorry yards, car parks, access roadways, and all other associated areas as detailed later in this report.

In general, only high colour rendering lamps are proposed to aid the visual tasks required such as parking. LED luminaires which exhibit a white light colour of 4000°K will be used. Luminaires will have tight optical control and emit light in the downwards direction only. Upward light is therefore limited.

Calculations have been made in the form of horizontal illuminance on various grid planes around the site in order to inform of compliance with this guidance.

This report should be read in conjunction with the CPW external lighting drawing CPW-190081-E-EXT-XX-01 which form part of the planning application drawings. For ease of reference, these drawings also form Appendix A of this report.

External Lighting Report

2.0 Lighting Design Brief

The site is predominantly surrounded by agricultural land next to the M62 motorway. Due to the site's location, the lighting design has been carried out in accordance with the St. Helens Local Plan Core Strategy document and also in accordance with the Ecologist's requirements to assess the impacts of lighting on habitat concerning bats in the ES.

The site is intended to be in used throughout the year with a 24-hour operational working day.

The external lighting concept design has been developed with reference to:

- CIBSE Lighting Guide LG6;
- BS 5489-1:2013 Code of practice for the design of road lighting Part 1: Lighting of roads and public amenity areas
- BS EN 12464-2:2014 Light and lighting—Lighting of work places Part 2: Outdoor work places
- CEN/TR 13201 (all parts) Road Lighting
- Institute of Lighting Professionals (ILP) Guidance Notes for the Reduction of Obtrusive Light GN01:2011.
- Guidance Note 08/18 Bats and artificial lighting in the UK
- Lighting Guide 6 - The Outdoor Environment
- Bats and Lighting Overview of current evidence and mitigation, Emma L Stone
- Landscape and Urban Design for Bats and Biodiversity, Bat Conservation Trust

Calculations have been made to assess the horizontal & vertical illuminance produced by the lighting design, as well as light pollution intensities on various grid planes around the site in order to apprise the light trespass toward nearby receptors.

The following pages detail the external lighting proposal and calculations against the required performance criteria. The required lighting levels are baseline targets which can be increased upon in areas as dictated by the landscaping and client's requirements.

External Lighting Report

3.0 Product Types

Type A-D

The D-Series luminaire is part of the Holophane Range. It is ideal for open spaced areas with its Asymmetric, Symmetric and Forward Throw light distribution options. Precisely controlled light distribution offers maximum efficiency keeping light pollution along with spillage and glare to a minimum.



Reference A - Single head 36,000lm forward throw LED modules are to be housed within an IP65 enclosure. Refer to the submitted drawings for mounting heights and tilt angles.

Reference A BLS - Single head 36,000lm forward throw with a back-light shield, LED modules are to be housed within an IP65 enclosure. Refer to the submitted drawings for mounting heights and tilt angles.

Reference C - Single head 16,000lm asymmetric distribution LED modules are to be housed within an IP65 enclosure. Refer to the submitted drawings for mounting heights and tilt angles.

Reference BLS - Single head 16,000lm forward throw with a back-light shield, LED modules are to be housed within an IP65 enclosure. Refer to the submitted drawings for mounting heights and tilt angles.

Reference D - Single headed 11,000lm asymmetric distribution LED modules are to be housed within IP65 enclosure. Refer to the submitted drawings for mounting heights and tilt angles.

Reference D BLS - Single headed 11,000lm asymmetric distribution with a back-light shield, to restrict illuminance on areas where Bat activity may be present. LED modules are to be housed within IP65 enclosure. Refer to the submitted drawings for mounting heights and tilt angles.

Type M

The building mounted Wallpackette III part of the Holophane range, it proves a high-performance with high efficiency. 3000 lumen package LED, refer to the submitted drawings for mounting heights and tilt angles.



External Lighting Report

4.0 Design Guidance: Bats

There is a likelihood that the site contains potential bat roosting and foraging habitats. Therefore, the design will need careful lighting design calculations to ensure that the potential areas are protected. The design will be carefully developed to ensure the Bats, their roosts and their bat routes are protected by law.

Illuminating a bat roost or even a known feeding route could result in an offence being committed as the bats are a protected species under the Wildlife & Countryside Act (1981), stating that it is illegal to kill, injure, capture or even disturb bats.

Research has found that one of the key problems for bats regarding lighting is the presence of UV within the source.

Ultraviolet light attracts the nocturnal insects which the bats feed on and as such the bats lose out on their food source and feeding opportunities.

UV is found in most of the traditional light sources with metal halide having the higher percentage. Modern LED lanterns and SON lighting have 0% UV so are preferential light sources within known bat areas

Table 5.3. Summary of current evidence of the impacts of different light types on each UK bat species/group

Light type	Species	Impact	Evidence
White LED	<i>Rhinolophus hipposideros</i> and <i>Myotis</i> spp.	Reduced activity and spatial avoidance of commuting routes	Stone <i>et al.</i> , 2012
Warm white LED	Unknown at present	Unknown - though likely to have less impact on light sensitive species than white light types	
Low pressure sodium	<i>Nyctalus noctula</i>	Increased activity and foraging	Rydell & Baagoe 1996
	<i>Pipistrellus</i> spp.	No significant increase in activity compared to dark areas	Blake <i>et al.</i> , 1994
High pressure sodium	<i>Rhinolophus hipposideros</i> and <i>Myotis</i> spp.	Reduced activity and spatial avoidance of commuting routes; delayed commuting time	Stone <i>et al.</i> , 2009; 2011
	<i>Pipistrellus</i> spp., <i>Nyctalus noctula</i> , <i>Eptesicus serotinus</i>	Increased activity and foraging	Rydell & Baagoe 1996
Compact fluorescent	Unknown at present	Unknown - though likely to have a similar impact on light sensitive species as other white light types	
Mercury vapor lamps	<i>P. pipistrellus</i> and <i>Pipistrellus</i> spp. <i>Eptesicus</i> spp.	Increased activity (Rydell (1991) recorded increased activity of <i>Eptesicus nilssonii</i> (a species not present in the UK) at mercury vapor lamps in Sweden in spring April – May)	Haffner & Stutz 1985; Blake <i>et al.</i> 1994, Rydell & Racey 1995.

Please note: Bat surveys have identified 'low' foraging and commuting activity for common pipistrelle, soprano pipistrelle and noctule along the northern boundary of Booth's Wood.

External Lighting Report

Table 5.3 taken from E.Stone; Bats and Lighting, summarises the type of light source and the impact on different species. It can be seen that no light source is perfect and the best solution is to have no lighting where bats are present. However, if lighting is required for safety and security then some sources are more preferential, particularly the Warm White LEDs.

No set parameters in terms of lux levels are set out by the legislations and very little research has been carried out to determine a specific value. However, one of the general principles which has been adopted by a number of planners is that a lighting level of 1 lux or above is not acceptable on the bat roost or known feeding routes.

The design has been produced with all the advice taken into account to reduce any potential impact on bats.

5.0 Illumination Levels

In accordance with the Chartered Institute of Building Services Engineers (CIBSE) Lighting Guide 6 (LG6), BS EN 12464-2:2014, BS 5489-1:2013 and BS EN 13201-2:2015, the following illumination levels are to be achieved:

Area	Maintained Illuminance (Lux)	Uniformity
Access Road	15	0.20
Car Parking	20	0.25
Dock Doors	50	0.40
Gatehouse	50	0.40
Lorry Parking	30	0.40
Service Yard	30	0.40
Perimeter Walkway	20	0.25

Average illumination levels achieved on CPW drawings CPW-190081-E-EXT-XX-01 are as follows:

Area	Average Level Achieved (Lux)	Uniformity
HGV Access Road	30	0.36
Car Park Access Road	30	0.70
North Dock Doors	64	0.53
Upper North Dock Doors	77	0.64
North Level Access	89	0.66
Upper North Level Access	87	0.72
South Dock Doors	57	0.37
Gatehouse	51	0.85
Fuel Island	51	0.89
Screened Vehicle Wash	50	0.89
Cycle Shelter	26	0.71

External Lighting Report

Area	Average Level Achieved (Lux)	Uniformity
North Service Yard	41	0.51
West Service Yard	30	0.49
West HGV Parking	36	0.43
East Service Yard & HGV Parking	54	0.41
South Service Yard	31	0.61
South HGV Parking	56	0.64
South East HGV Parking	35	0.54
South East Service Yard	36	0.40
South East Level Access	101	0.84
South East Dock Doors	86	0.38
South Car Park	56	0.30
Office Entrance	104	1.00
Turnstiles	65	0.54
Office Walkway	39	0.91
M62 Spill Light	0.28	-

It should be noted that the lighting calculations carried out for the dock door areas are based on 'worst case' scenarios with no vehicles included in the calculated lux levels. These lighting levels typically improve to in excess of the standard requirements when the building is in use with trailers parked in the loading bays.

Lighting columns are to be installed in the service yards at a height of 12m & 8m and 6m within the car parks in order to reach the required illumination levels. They need to be installed at these different heights in order to keep glare to a minimum for drivers as well as being compliant with limiting glare and illuminance to nearby areas.

It is preferable to have 0 lux reaching the woodland; however, it is lit by 1 lux, this is due to the fact that the service yard needs to be sufficiently lit to conform to health & safety standards. It is not possible to achieve the health & safety standards without spill light of 1 lux.

External Lighting Report

6.0 ILP Guidance Notes for the Reduction of Obtrusive Light, 2011

In accordance with the Institute of Lighting Professionals (ILP) 'Guidance Notes for the Reduction of Obtrusive Light, 2011'.

A preliminary assessment of the development has identified it as environmental zone of E2.

Category	Examples	
E1:	Intrinsically dark landscapes	National Parks, Areas of Outstanding Natural Beauty, etc.
E2:	Low district brightness areas	Rural, small village, or relatively dark urban locations.
E3:	Medium district brightness areas	Small town centres or urban locations
E4:	High district brightness areas	Town/city centres with high levels of night-time activity

Having an environmental zone of E2 indicates that the design shall need to comply with the table below:

Environmental Zone	Sky Glow ULR (Max %)	Light Trespass (into windows) Ev (Lux)		Source Intensity I (kcd)		Building Luminance Pre-curfew
		Pre-curfew	Post-curfew	Pre-curfew	Post-curfew	Average, L
E1	0	2	1*	2.5	0	0
E2	2.5	5	1	7.5	0.5	5
E3	5	10	2	10	1	10
E4	15	25	5	25	2.5	25

- ULR** Upward light ratio of the installation is the maximum permitted percentage of luminaire flux for the total installation that goes directly into the sky.
- EV** Vertical illuminance in lux and is measured flat on the glazing at the centre of the window.
- I** Light intensity in Cd.
- L** Luminance in Cd/m².
- Curfew** Time after which stricter requirements (for the control of obtrusive light) will apply; often a condition of lighting applied by the local authority. If not stated—23:00h is suggested.

External Lighting Report

7.0 Key Receptors

	E2 Maximum	Observer Reference 1	Observer Reference 2	Observer Reference 3	Observer Reference 4	Observer Reference 5	Observer Reference 6	Observer Reference 7
<u>Light intrusion (into windows) Ev Lux</u>								
Pre-curfew	5	2	1	0	0	0	0	0
Post-curfew	1	N/a	1	0	0	0	0	0
<u>Luminaire Intensity I (candelas)</u>								
Pre-curfew	7,500	1216	1666	212	203	295	157	108
Post-curfew	500	N/a	N/a	212	203	295	157	108

Reference 1: Please note there is no post curfew as observer is 24-hour use.

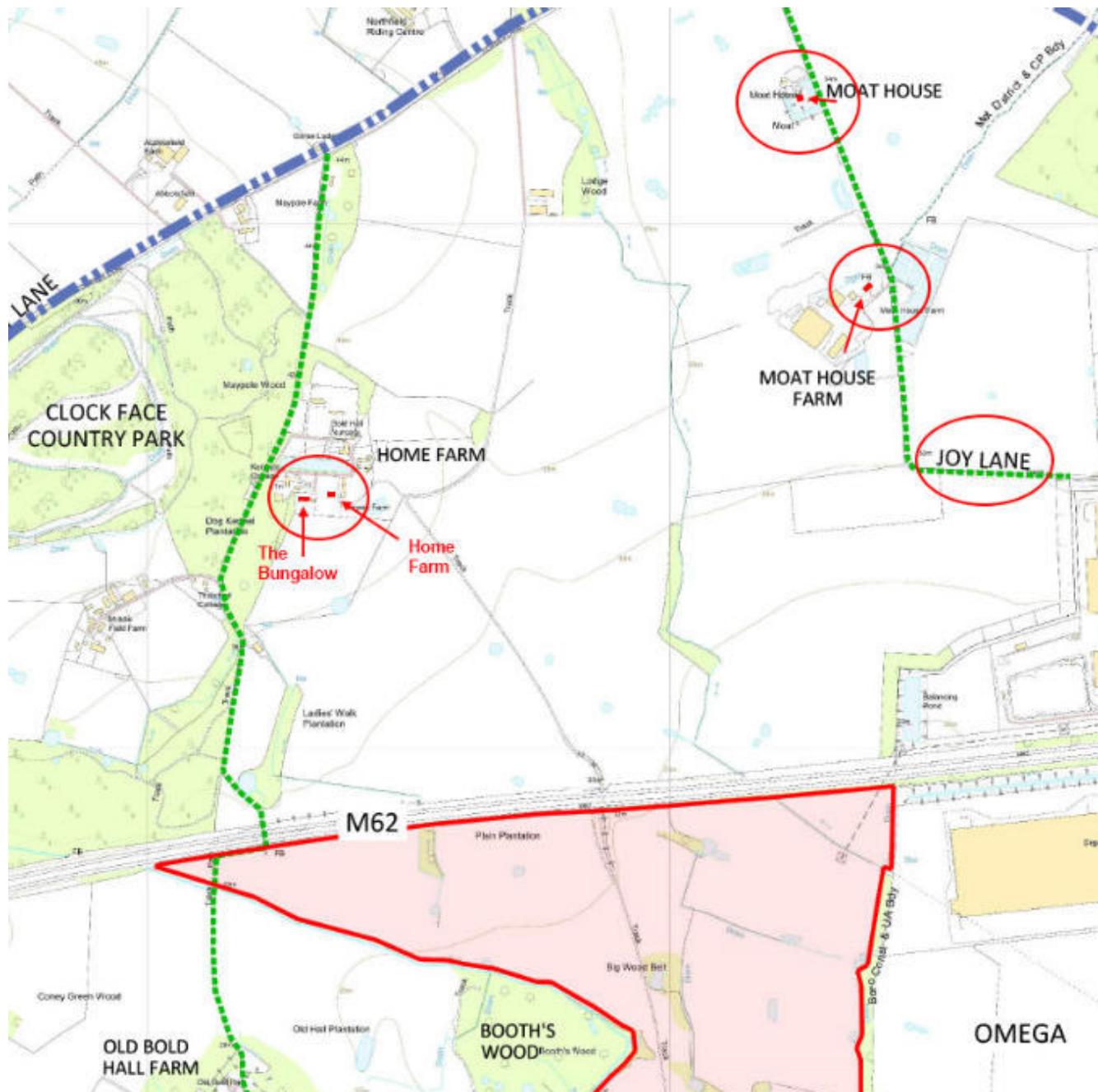
Reference 2: Please note there is no post curfew as observer has no human occupants.

8.0 Glare Evaluation

Observer point calculations have been undertaken to demonstrate that the CPW External Lighting drawings are compliant to BS EN 12464-2:2014 permissible Glare Ratings for the following areas. Glare calculations have been undertaken at each receptor point at 1.5m high (eye level).

	Maximum Glare Rating (R_{gl})	CIE -112-1994 Table 3.1 – Assessment Scale
Observer Reference 1 (M62)	10	Unnoticeable
Observer Reference 2 (Booth's Woods)	10	Unnoticeable
Observer Reference 3 (Home Farm)	10	Unnoticeable
Observer Reference 4 (The Bungalow)	10	Unnoticeable
Observer Reference 5 (Joy Lane)	10	Unnoticeable
Observer Reference 6 (Moat House Farm)	10	Unnoticeable
Observer Reference 7 (Moat House)	10	Unnoticeable

External Lighting Report



External Lighting Report

9.0 Site Location Plan



External Lighting Report

10.0 Lighting Levels

The minimum recommended levels are 30 lux average for the lorry yard and 20 lux average for car parking. Increased illuminance levels of 50 lux average to the loading canopies where more arduous activities will be performed.

These lighting levels are baseline targets which meet the minimum levels within current British Standards (BS EN 12464-2:2014) and Lighting Guide LG6.

The lighting scheme produced indicate that the proposed development is within the parameters specified within the ILP guidance notes for the reduction of obtrusive light, GN01:2011. The luminaires have been carefully selected to minimise upward light spill, glare and backwards light spillage. This has been achieved by ensuring all luminaires are installed on a flat plane at 0°.

The achieved average levels all equal or exceed the targeted illumination levels which can be found earlier on in the report.

All external lighting is to be controlled with a photocell and time clock such that the lighting will be energised at low ambient lighting and will switch off during daylight hours. (Final settings to be determined by Client).

The design has achieved a maximum glare rating of 10 R_{gl} from the Observer points. As per CIE 112-1994 Table 3.1 this indicates that the installation luminaries will be ‘unnoticeable’.

External Lighting Report

11.0 Summary

The scheme has been developed to reduce the impact that the external lighting would have on the surrounding areas. The scheme produced shows that the illuminance spillage and glare towards the observer reference points indicated are within the parameters of environmental zone E2.

The lighting scheme is based around a low pollution, low energy and low maintenance strategy. Considerations were also given to low energy products which have excellent light control optics such that their efficiencies are maximised and carbon footprint minimised. The management and maintenance of the external lighting would be determined at detailed design stage and will need to meet the needs of the tenant.

Alternative luminaires may develop and be introduced into the market during the detailed design stage, however the philosophy of downward light only should always be retained and implemented into the finalised design.

External Lighting Report

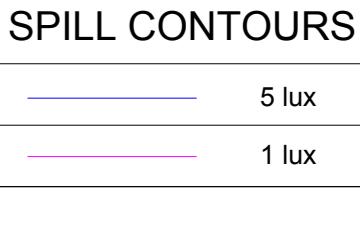
12.0 Appendix A – CPW External Lighting drawings

CPW-190081-E-EXT-XX-01 – P2 - Proposed External Lighting Layout

- NOTES:**
- ELECTRICAL CONTRACTOR TO VERIFY LIGHTING DESIGN PRIOR TO INSTALLATION, THIS IS ONLY A CONCEPTUAL DESIGN.
 - ELECTRICAL CONTRACTOR TO READ THIS DRAWING IN CONJUNCTION WITH THE PROJECT SPECIFICATIONS.
 - ELECTRICAL CONTRACTOR TO ENSURE THE CAR PARK LUMINARIES ARE INSTALLED TO COORDINATE WITH THE CAR PARK LOCATIONS.
 - ELECTRICAL CONTRACTOR TO ENSURE CABLES AND LIGHTING COLUMNS ARE LOCATED SUCH THAT THEY WILL NOT BE AFFECTED BY THE FUTURE GROWTH OF THE TREE ROOT, ETC, IN THE AREA OF THE CAR PARK.
 - ALL EXTERNAL LIGHTING IS TO BE CONTROLLED WITH A PHOTO CELL, LOCATED ON THE NORTH ELEVATION, WHICH ALSO HAVE A FILTER SO THAT THE LIGHTING WILL ENERGISE AT LOW AMBIENT LIGHTING.
 - THE LIGHTING DESIGN TO COMPLY WITH THE CIBSE GUIDE LG06, THE OUTDOOR ENVIRONMENT, AND THE ILP GUIDANCE NOTES FOR REDUCTION OF OBTRUSIVE LIGHT, 2011 AND ALL LATEST ADDITIONS.
 - ROAD LIGHTING DESIGNED TO COMPLY WITH BS5489-1:2013 CODE OF PRACTICE FOR DESIGN OF ROAD LIGHTING.

LEGEND:

- A** □ WALL / COLUMN MOUNTED D-SERIES LA364, FORWARD THRU OPTIC, WITH BACKLIGHT SHIELD. 3600 INITIAL LUMENS PER LAMP. MAINTENANCE FACTOR = 1. WATTS PER LUMINAIRE = 328. LUMINAIRE LUMENS PER CIRCUIT WATT = 109.7. TILT ANGLE= AS DETAILED. MOUNTING HEIGHT= AS DETAILED.
- A BLS** □ WALL / COLUMN MOUNTED D-SERIES LA364, FORWARD THRU OPTIC, WITH BACKLIGHT SHIELD. 3600 INITIAL LUMENS PER LAMP. MAINTENANCE FACTOR = 1. WATTS PER LUMINAIRE = 328. LUMINAIRE LUMENS PER CIRCUIT WATT = 109.7. TILT ANGLE= AS DETAILED. MOUNTING HEIGHT= AS DETAILED.
- C BLS** □ BUILDING/COLUMN MOUNTED D-SERIES LA114, C/S FORWARD THRU OPTIC. 16500 INITIAL LUMENS PER LAMP. MAINTENANCE FACTOR = 1. WATTS PER LUMINAIRE = 131. LUMINAIRE LUMENS PER CIRCUIT WATT = 122.1. TILT ANGLE= AS DETAILED. MOUNTING HEIGHT= AS DETAILED.
- D** □ BUILDING/COLUMN MOUNTED D-SERIES LA114, ASYMETRIC OPTIC. 11000 INITIAL LUMENS PER LAMP. MAINTENANCE FACTOR = 1. WATTS PER LUMINAIRE = 101. LUMINAIRE LUMENS PER CIRCUIT WATT = 108.9. TILT ANGLE= AS DETAILED. MOUNTING HEIGHT= AS DETAILED.
- D BLS** □ BUILDING/COLUMN MOUNTED D-SERIES LA114, FORWARD THRU OPTIC, WITH BACKLIGHT SHIELD. 11000 INITIAL LUMENS PER LAMP. MAINTENANCE FACTOR = 1. WATTS PER LUMINAIRE = 101. LUMINAIRE LUMENS PER CIRCUIT WATT = 108.9. TILT ANGLE= AS DETAILED. MOUNTING HEIGHT= AS DETAILED.
- M** □ BUILDING MOUNTED WALLPACKETTE III, PREMIA DEFROSTER. 3000 INITIAL LUMENS PER LAMP. MAINTENANCE FACTOR = 1. WATTS PER LUMINAIRE = 31. LUMINAIRE LUMENS PER CIRCUIT WATT = 96.7. TILT ANGLE= AS DETAILED. MOUNTING HEIGHT= AS DETAILED. MH= DENOTES MOUNTING HEIGHT. TILT= DENOTES TILT ANGLE



This drawing is an indicative layout only, demonstrating the conceptual requirements correlating to the agreed design intent. The purpose of this drawing is to demonstrate design intent, for further development by the relevant services designer only.

P2 13/12/19 SITE PLAN UPDATED
P1 15/11/19 PRELIMINARY ISSUE
REV DATE BY VE

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STATUS
ISSUED FOR PLANNING
CLIENT
OMEGA ST. HELENS LTD
/ T. J. MORRIS LIMITED

PROJECT
UNIT 1
OMEGA ZONE 8
ST. HELENS
DRAWING TITLE
PROPOSED EXTERNAL LIGHTING LAYOUT

SCALE (in)
1:750

DATE
08/11/19

BY
CP CW

REV
P2

DRAWING NUMBER
CPW-190081-E-EXT-XX-01

FILE XREF(S)

